Cruiser and Destroyer Modernization Programs

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Agenda

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- AEGIS Fleet Modernization
- Cruiser (CG) Modernization
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  - Requirements
  - Combat System / HM&E Upgrades
  - Projected Fielding Profile
- Destroyer (DDG) Modernization
  - Program Description
  - Requirements
  - Combat System / HM&E Upgrades
  - Projected Fielding Profile
- Summary

AEGIS Fleet Modernization

Why Modernize?

- Maintain Naval Force to meet National Security Strategy
  - Sustain Force Structure
  - Support Strike Groups within FRP
  - Without modernization, ships decommission early (CG 47 - CG 51)
  - HM&E improvements to achieve expected service life
  - Cost effective compared to new construction
- Modernization required for combat relevance
  - Pace the threat
  - BMD capacity and functionality
  - Open Architecture (OA) bridge to future combat systems
- All Modernized CGs and DDGs will have common AWS configuration
  - Common configuration = reduced life-cycle cost
  - Aegis OA provides path to future warfighting upgrades

Cruiser Modernization

CG Modernization Program Description

- Delivers introduction of critical new warfighting capabilities
  - Enhances Air Dominance and C4I through numerous system improvements
    - CEC, SPY, AEGIS Weapon System Improvements, & Next Generation Consoles
  - Enhances Gun Weapon System capability
    - 5”/62 Caliber Gun Mounts, Naval Fires Upgrades: Optical Sight & MK 160 FCS
  - Improves force protection/layered defense
    - ESSM, CIWS Block 1B, & SPQ-9B (ASMD)
  - Provides COTS computing architecture as first step to Open Architecture positioning CGs to more affordably receive future BMD, air defense, and other upgrades
- Provides Operational Availability improvements through reduced maintenance and mission life extension
  - Reduces combat system and computer program maintenance costs through baseline commonality and consolidation
  - Achieves mission relevant service life of 35-years (Combat Systems, Smart Ship, All-Electric, Digital Fuel Controls, Aviation Mods, Corrosion Ctrl, QoL Improvements)
- Applies to AEGIS Class CGs 52 through 73

Cruiser Modernization

Baseline 2 Requirements

Warfighting Upgrades

C4I
CEC
SGS A/C
CDLMS

AAW
ACB-08 Computer Program
TI-08 OA/COTS Computing Plant
Radar and Display Upgrades
VLS Modifications

SHIP/FORCE PROTECTION
ESSM
*CIWS BLK 1B
SPQ-9B (ASMD)
SARTIS
MK-116 Mod 7

GUN WEAPON SYSTEM
(2) 5 inch/62 Guns
MK-160 Gun Computing System
EOSS

Integrated Ship Control Upgrades

HM&E Modernization
All Electric Modifications
IBS Upgrade
MCS Upgrades
Structural Modifications
Quality of Life Upgrades

*Funded outside of Modernization Program

Cruiser Modernization

Baseline 3 & 4 Requirements

Warfighting Upgrades

C4I
CEC

AAW
TI-12 CIC Display Upgrades
TI-12 Open Architecture Computing Plant
VLS Modifications
AWS ACB-12 Computer Program
Multi-Mission SIGPRO (B/L 4)
SPY-1B Transmitter Upgrades (B/L 4)
Multi-Mission BMD (B/L 4)
SM6/NIFC-CA (IOC FY14)
FCS STAMO Upgrades

SHIP/FORCE PROTECTION
ESSM
***CIWS BLK 1B**
SPQ-9B (ASMD)
SARTIS
SQQ-89A(V)15 w/MFTA

GUN WEAPON SYSTEM
(2) 5 inch/62 Guns
MK-160 Gun Computing System
EOSS

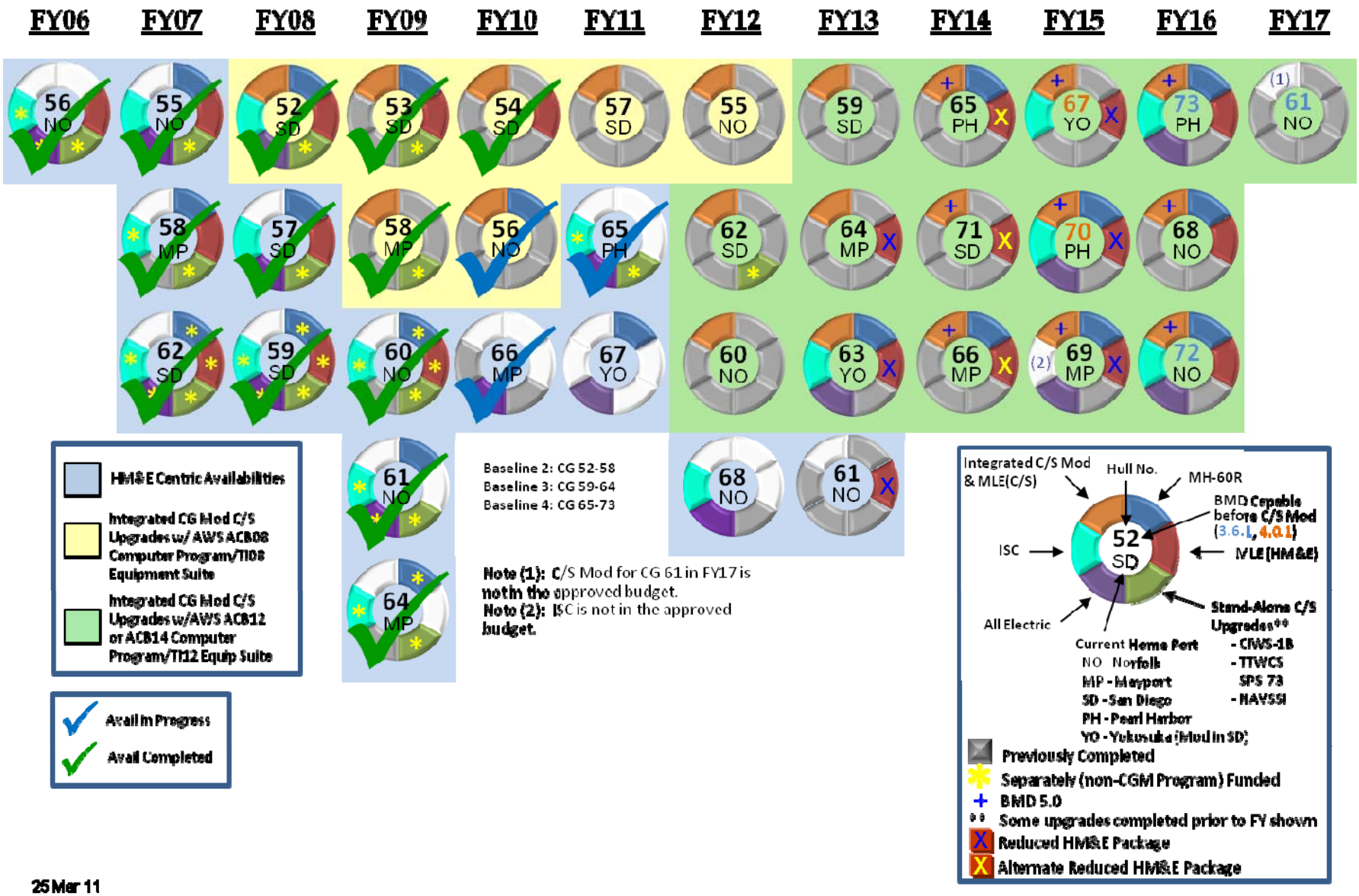
Integrated Ship Control Upgrades

HM&E MODERNIZATION
All Electric Modifications
IBS Upgrade
MCS Upgrades
Structural Modifications
Quality of Life Upgrades

Currently all B/L 4 CGs are programmed for BMD 5.0 to be fielded in FY14 - FY16

***Funded outside of Modernization Program**

PB12 Cruiser Modernization Fielding Profile as Supported by FMP Funds



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Destroyer Modernization

DDG Modernization Program Description

- **Mission: Provide a comprehensive modernization strategy for the DDG 51 Class ships to ensure a mission relevant service life of 35-years**
- **Description: Primary objective is to reduce workload and total ship class ownership costs via HM&E technology insertion and to provide core combat system open architecture COTS computing environment and warfighting improvements**
- **Ships: DDG 51 Class (Flight I & II first, DDG 51 – 78)**
- **Employment: Will provide critical foundation for various other SeaPower 21 efforts**
- **Status: DDG Modernization is in the execution phase**
  - **HM&E Availabilities began in 2010**
  - **First Combat Systems upgrade scheduled for FY 2012**

Destroyer Modernization

Warfighting Upgrades

C4I
*NAVSSI BLK 4
*IFF Mode 5
CEC

AAW
CIC Display Upgrades
Open Architecture Computing Plant
VLS Modifications
AWS ACB 12 Computer Program
Multi-Mission SIGPRO
SPY-1D Transmitter Upgrades
Multi-Mission BMD
SM6/NIFC-CA (IOC FY14)
FCS STAMO Upgrades

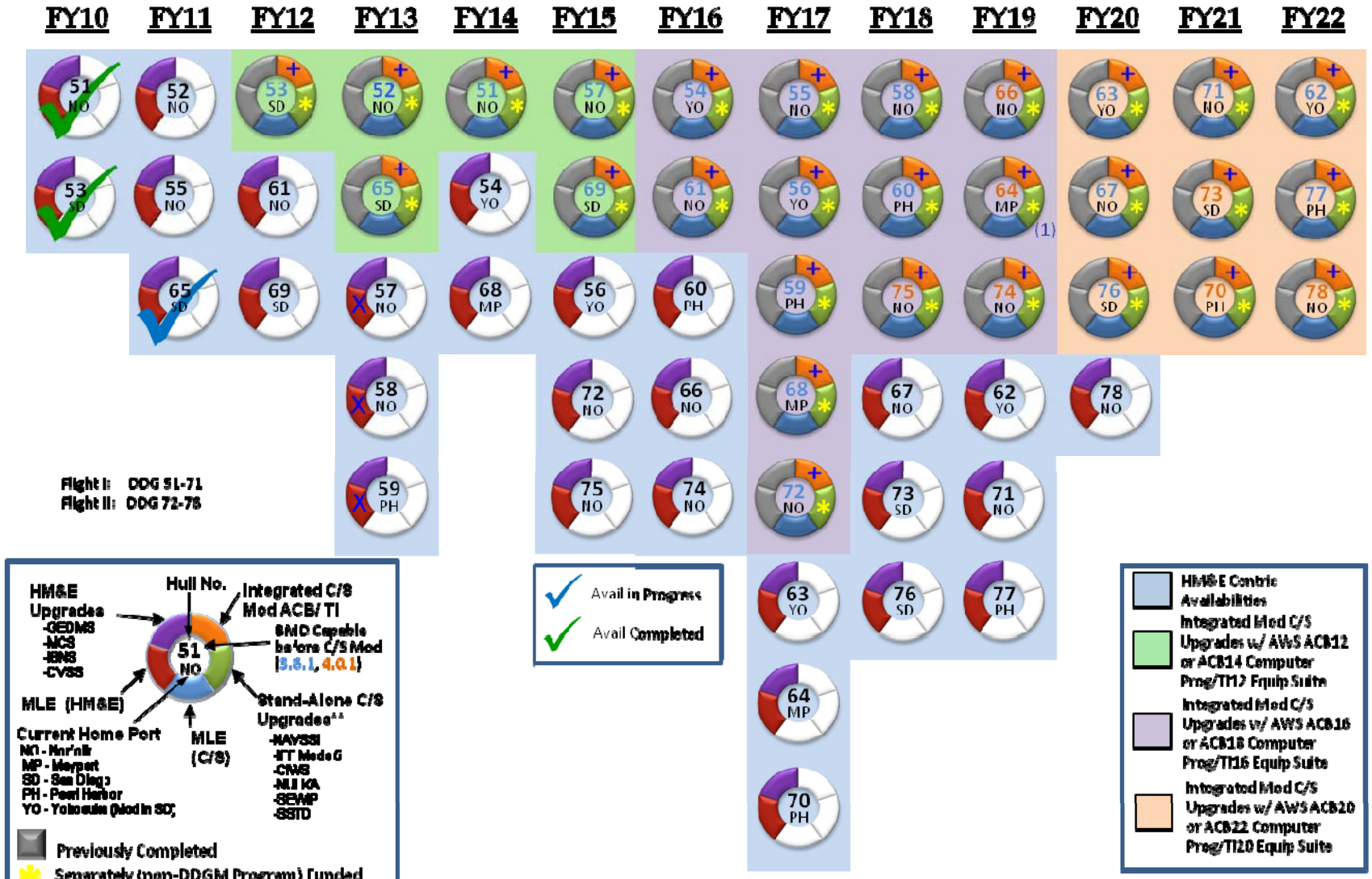
SHIP/FORCE PROTECTION
ESSM
*CIWS BLK 1B
*NULKA
*SEWIP
*SSTD (ATT) – IOC FY13
MK 54 Torpedo/DFCI
SQQ-89A(V)15 w/MFTA

GUN WEAPON SYSTEM
MK 160 Mod 15 Gun Computing System

*Funded outside of Modernization Program

HM&E Modernization
Full IBNS Upgrade
MCS/DCS Upgrades
GEDMS
Wireless Communications
Digital Video Surveillance
Quality of Life Upgrades
Advanced Galley
Mission Life Extension Upgrades

PB12 Destroyer Modernization Fielding Profile as Supported by FMP Funds



Summary

- CG and DDG Modernization Programs being budgeted and executed to fulfill requirements established by N86
- Fielding for both programs is underway
  - CG:
    - CG 56 Combat System upgrade in progress
      - CGs 52, 53, 54 & 58 complete
    - HM&E upgrades in progress for all CG baselines
    - Baseline 3 CG Combat System upgrades commence in FY12
      - CG 62 in January 2012, CG 60 in April 2012
    - Baseline 4 CG Combat System upgrades commence in FY14
      - CG 65 January 2014, CG 71 in January 2014 and CG 66 in February 2014
  - DDG:
    - First HM&E upgrades completed on DDG 53 and DDG 51
    - First Combat System upgrades will commence in FY12
      - DDG 53 in June 2012

Back Up

Background

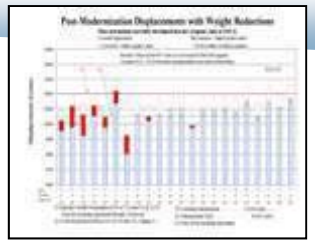
- Cruiser Conversion Program established in 1998
  - Originally included all 27 Cruisers
  - Eventually modified to include only the Baseline 2, 3 and 4 Cruisers
- Congress terminated the Cruiser Conversion Program in 2004 (PB05)
- Cruiser Modernization Program established (PB06)
  - Largely based on original Cruiser Conversion Program Requirements
  - Split availability approach to delivering required HM&E and Combat System capabilities
  - HM&E upgrades began in FY06, as Combat Systems elements not ready for installation until FY08
- DDG Modernization Program started with a Congressional Plus Up in the FY06 Defense Appropriations Act in conjunction with DDG new construction
- DDG Modernization Program of Record established in PB08
  - Cruiser Modernization Program requirements starting point
  - Eventually amended to include BMD and other capabilities
  - Under common management with Cruiser Modernization in PMS 400F
  - Combat Systems Upgrade scheduled in FY12 to coincide with readiness of ACB12 for installation
- Both CG and DDG Modernization brought before the R3B in 2006

Cruiser Modernization
(HM&E)

Service Life Upgrade Contribution to Overall Platform Improvement

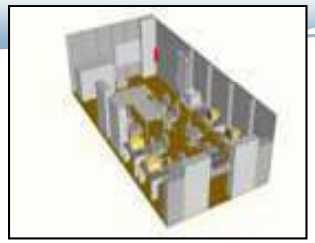
ALL ELECTRIC

- Removes Waste Heat Boilers
- Installs Reverse Osmosis Desalination Plant
- Replaces Steam Galley Equipment with Electric Equipment
- Replaces Steam Laundry Equipment with Electric Equipment
- Removes Steam Piping and Valves



HM&E UPGRADES

- WT/Moment Corrections
- Hull & Deckhouse Structural Mods
- LM2500 Digital Fuel Control
- Tank Level Indicator Upgrade
- Watertight Door Upgrades

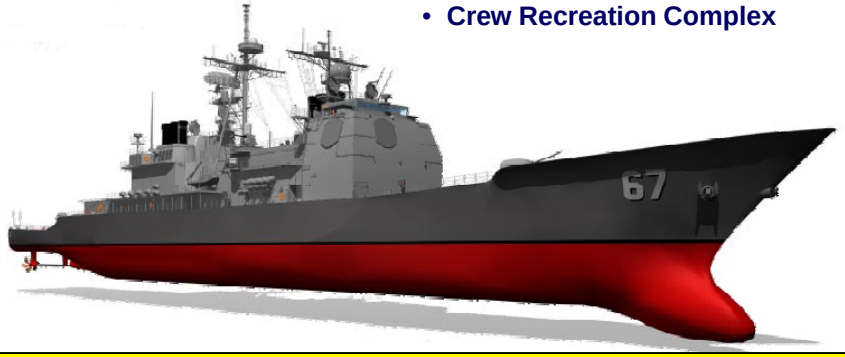


QUALITY OF LIFE UPGRADES

- Corrosion Control Enhancements
- Stainless Sanitary Space Upgrades
- CHT System Modifications
- Learning Resource Center
- Crew Recreation Complex

INTEGRATED SHIP CONTROLS

- Replaces 1970's Machinery Control System
- Replaces 1970's Ship Control Equipment
- Installs COTS Based Controls
- Installs ECDS-N Certified Integrated Bridge System



New HM&E support systems allow for achievement of expected service life, increased maintainability, reduced workload, and improved quality of life

Baseline Two Cruiser Modernization

Combat System Upgrade Contribution to Overall Platform Improvement

SUW

SPQ-9B:
- Pulse Doppler Radar
- Increases capability against small targets in clutter environment (Littoral)
- GWS Sensor

AWS/SPY:
- Improved computing and display capabilities
- Improves operators ability to recognize surface threats, manage surface picture and engage required targets

MK-34 GWS:
- Combination of MK-160, Mod 4 Gun and EOSS
- Increases number of options available to operator for detection and engagement of surface threat
- Digital fire control and improved gun accuracy of first shot

CIWS BLK 1B:
- IR Sensor
- Inherent anti-surface capability

USW

MK-116 MOD 7 Upgrade (CG 52-58):
- Improved reliability
- Increase in level of integration with AWS
- Mitigates obsolescence issues

AW

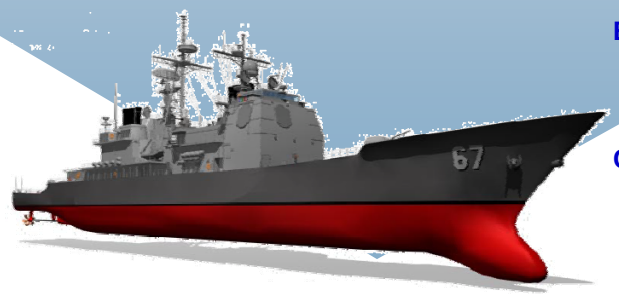
SPQ-9B:
- Pulse Doppler Radar
- Improved capability to detect and track low-flying, high speed, small RCS ASCMs in heavy clutter
- Integrated to cue SPY Radar and improve overall AWS capabilities against the ASCM threat

AWS/SPY:
- Improved computing and display capabilities
- Faster processing and greater track capacity
- SPY OA features improved algorithms for AW processing
- Improved displays increase operator's ability to maintain situational awareness and improve ability to discern and act on air threat

CEC:
- Fire control quality data link
- Allows utilization of off ship sensor data
- Allows for greater force-wide engagement

ESSM:
- Quick Reaction, relatively short ranged missile
- Provides increased defense in depth in conjunction with SPQ-9B, upgraded AWS, CEC, SM-2 and CIWS

CIWS BLK IB:
- Increased probability of kill due to tighter firing pattern



Modernized Cruiser: Faster Reaction and Improved Engagement Against the Three Dimensional Threat (Includes Open Architecture enabling more affordable future upgrades)

Baseline 3 & 4 Cruiser Modernization

Combat System Upgrade Contribution to Overall Platform Improvement

SUW

SPQ-9B:
- Pulse Doppler Radar
- Increases capability against small targets in clutter environment (Littoral)
- GWS Sensor

AWS/SPY:
- Improved computing and display capabilities
- Improves operators ability to recognize surface threats, manage surface picture and engage required targets
- SPY Horizon Track While Scan, for B/L 3&4, will improve capability to detect small craft and decrease potential to misidentify such targets as clutter

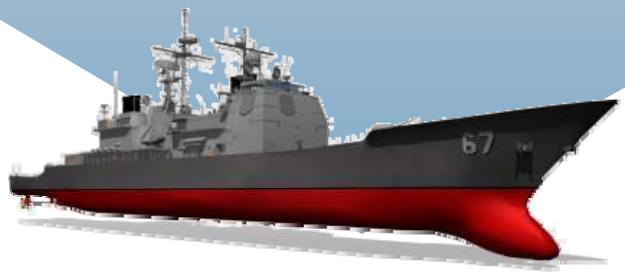
AWS/MULTI-MISSION SIGPRO (B/L 4):
- Add Aegis Littoral Processor to system allowing discerning of surface targets against land heavy background clutter along with improved capability to detect small craft and decrease potential to misidentify such targets as clutter

MK-34 GWS:
- Combination of MK-160, Mod 4 Gun and EOSS
- Increases number of options available to operator for detection and engagement of surface threat
- Digital fire control and improved gun accuracy of first shot

CIWS BLK 1B:
- IR Sensor
- Inherent anti-surface capability

USW

SQQ-89A(V)15 (CG 59-73):
- Increases ability to detect/engage in both open and shallow water
- Improved computing and displays
- Multi-Function Towed Array (MFTA) allows for improved passive ops and bi-static sonar operations
  - MFTA acts as receiver
  - SQS-53 is transmitter
- Improved torpedo detection capabilities
- Surface ASW Synthetic Training (SAST)
- Continuous Active Sonar



AW/BMD

MULTI-MISSION SIGPRO (B/L 4):
- Adds BMD mission to ships not already capable
- Add Aegis Littoral Processor to system allowing discerning of air targets against land heavy background clutter with improved capability to detect small craft & decrease potential to misidentify such targets as clutter

SPQ-9B:
- Pulse Doppler Radar
- Improved capability to detect and track low-flying, high speed, small RCS ASCMs in heavy clutter
- Integrated to cue SPY Radar and improve overall AWS capabilities against the ASCM threat

AWS/SPY OA:
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ESSM:
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- Provides increased defense in depth in conjunction with SPQ-9B, upgraded AWS, CEC, SM-2 and CIWS

CIWS BLK IB:
- Increased probability of kill due to tighter firing pattern

SM-6/NIFC-CA:
- Active seeker missile that will provide for engagements at extended ranges
- Integrated fire control network will improve ranges at which targets may be engaged and potential for larger number of missiles in-flight to defend the force

Capabilities beyond those introduced aboard the modernized B/L 2 Cruiser

Faster Reaction and Improved Engagement Against the Three Dimensional Threat

Cruiser Modernization
(HM&E)

Service Life Upgrade Contribution to Overall Platform Improvement

ALL ELECTRIC

- Removes Waste Heat Boilers
- Installs Reverse Osmosis Desalination Plant
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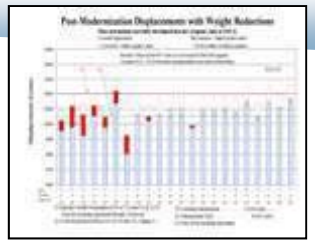

HM&E UPGRADES

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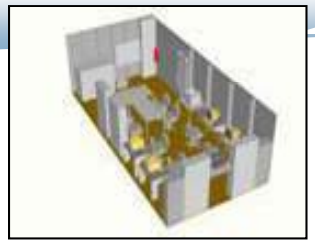

QUALITY OF LIFE UPGRADES

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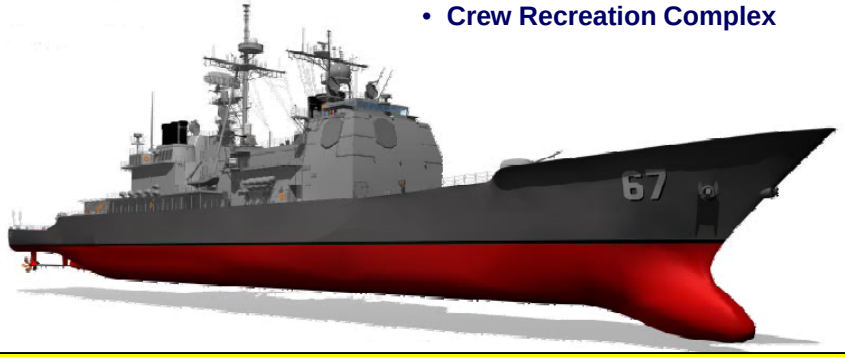

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Destroyer Modernization

Combat System Upgrade Contribution to Overall Platform Improvement

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- SPY Horizon Track While Scan will improve capability to detect small craft and decrease potential to misidentify such targets as clutter

MULTI-MISSION SIGPRO (MMSP):
- Add Aegis Littoral Processor to system allowing discerning of air targets against land heavy background clutter along with improved capability to detect small craft and decrease potential to misidentify such targets as clutter

MK-160 FCS:
- Increases number of options available to operator for detection and engagement of surface threat
- Digital fire control and gun improved accuracy of first shot

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USW

SQQ-89A(V)15:
- Upgrade for Flight I and II
- Increases ability to detect/engage in both open and shallow water
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  - MFTA acts as receiver
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- Improved torpedo detection capabilities
- Surface ASW Synthetic Training (SAST)
- Continuous Active Sonar

AW/BMD

MULTI-MISSION SIGPRO:
- Adds integrated/multi-mission BMD to class.
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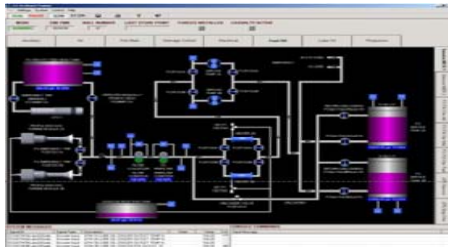
Faster Reaction and Improved Engagement Against the Three Dimensional Threat

DDG Modernization
HM&E Foundation

7 CORE Changes

MCS/DCS Upgrades
SCD 1604

w/ Embedded Onboard Training



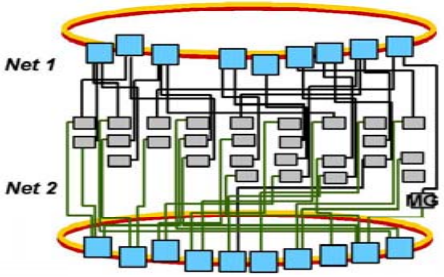
MISSION LIFE EXTENSION (MLE) UPGRADES

- Bow Strengthening
- Tank Top Stiffening
- VCHT Upgrades
- Mafo Doors

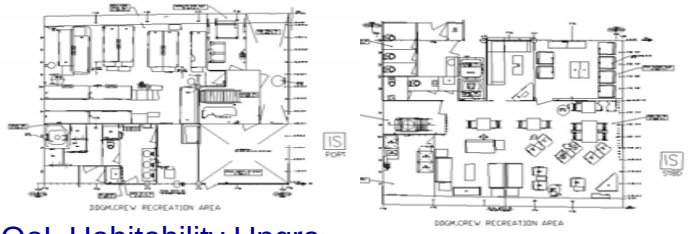
Advanced Galley
SCD 1605

Upgrade to Full Integrated Bridge System (IBS)
SCD 1726

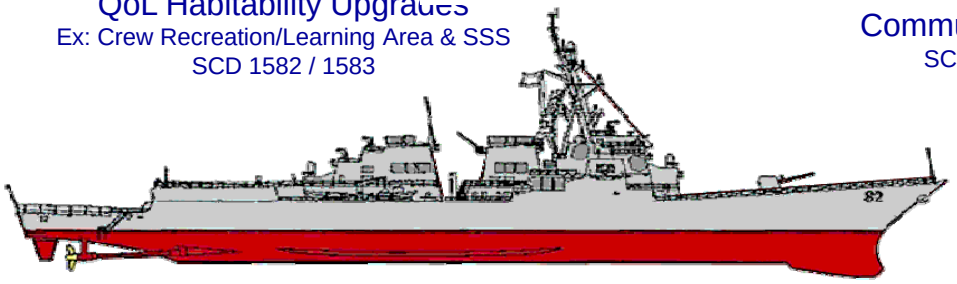
Replace Copper DMS With GEDMS Fiber Optic LAN Backbone
SCD 3088



Digital Video Surveillance System (DVSS)
SCD 1615

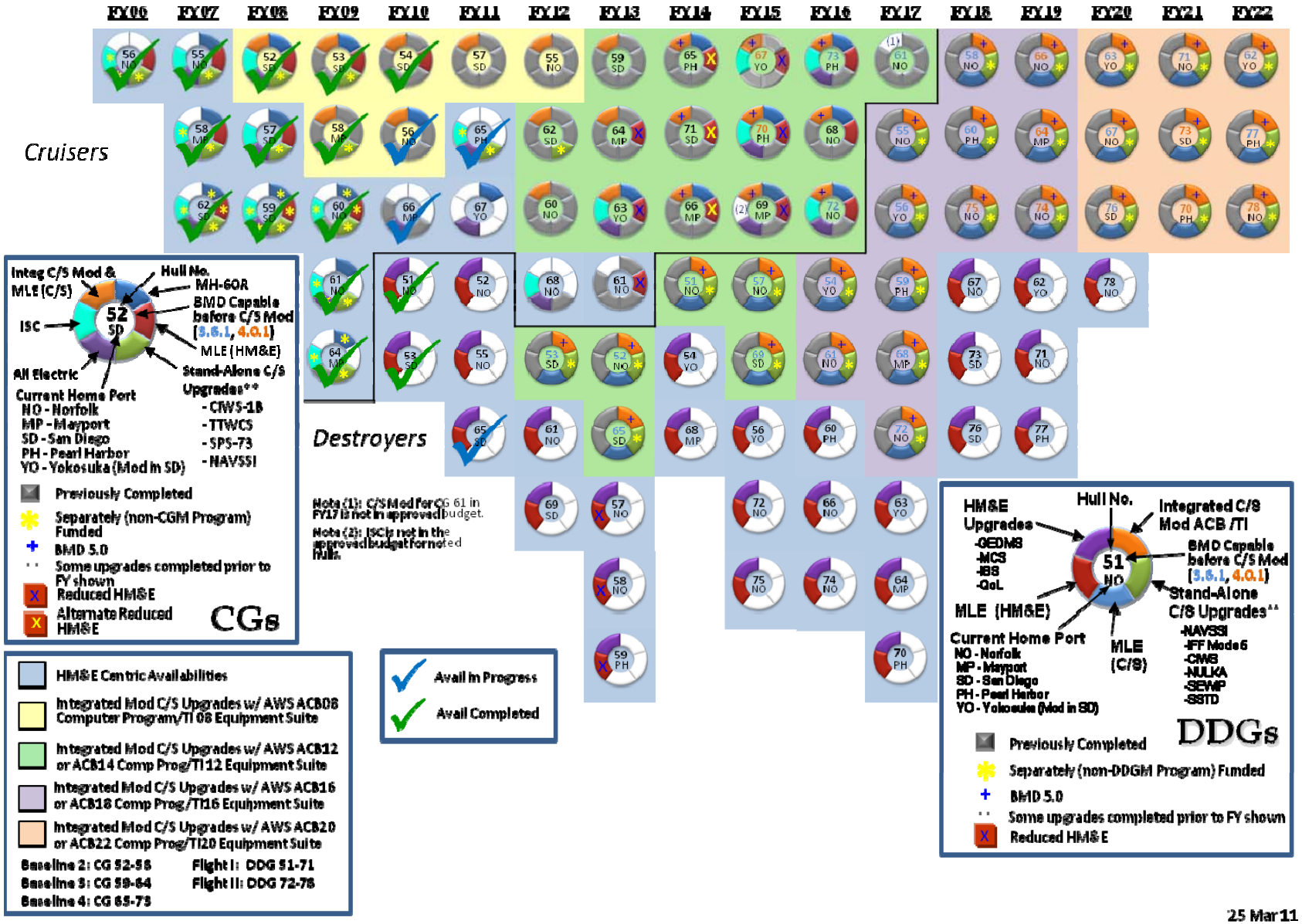


QoL Habitability Upgrades
Ex: Crew Recreation/Learning Area & SSS
SCD 1582 / 1583



Wireless Communications
SCD 1688

PB12 CG & DDG Modernization Fielding Profiles



PEO Ships Organization